

4. AI Tutors

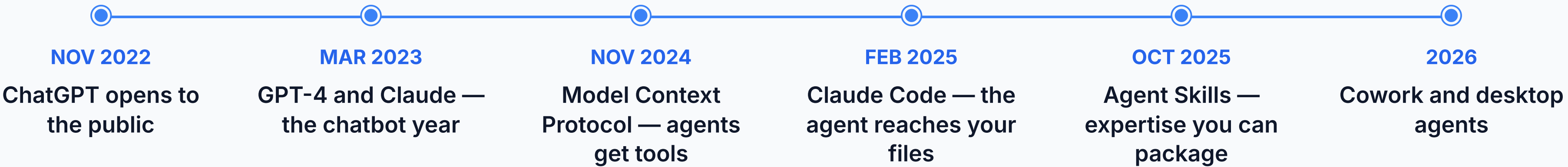
Rice Business 2026

Kerry Back
Rice Business



Our AI mission: To explore strange new worlds, to seek out new life and new civilizations, to boldly go where no one has gone before

Four Years, Chatbot to Agent



AI has been truly useful for less than 18 months

Andrej Karpathy, OpenAI co-founder, former Tesla AI chief, now at Anthropic

October 2025

"They just don't work. They don't have enough intelligence, they're not multimodal enough, they can't do computer use and all this stuff. They don't have continual learning. You can't just tell them something and they'll remember it."

"I feel like the industry is making too big of a jump and is trying to pretend like this is amazing, and it's not. It's slop."

December 2025

"I really am mostly programming in English now, a bit sheepishly telling the LLM what code to write... in words. Biggest change to my basic coding workflow in ~2 decades."

February 2026

"It is hard to communicate how much programming has changed due to AI in the last 2 months: not gradually and over time in the 'progress as usual' way, but specifically this last December. Coding agents basically didn't work before December."

"I don't think I've typed like a line of code probably since December."

What HBS Is Doing

Course tutorbots

Live AI case exercises

In-class AI simulations

No-code data analysis

**AI feedback on student
work**

Classroom avatars

Details and sources: rice-workshop.kerryback.com/hbs.html

Today's Session

1

Data Analysis



2

Tutors



3

Skill Demos

Gemini Notebook (previously NotebookLM)

Free knowledge repository. Upload as many as 50 sources into each notebook. Get a chatbot that answers from sources, narrated slides, podcast-style audio, quizzes, ...

- Chatbot example: [Options textbook](#)
- Narrated slides example: [Kapadia-Ostdiek-Weston paper](#)
- Podcast example: [Put-call parity from textbook](#)

Chatbot is great. Videos are good for a short change of pace. We can specify **only use this part of the source** for video or podcast. Cannot revise directly but can regenerate with new instructions.

Data Analysis

1. Run a Regression

Prompt

Read data.xlsx. Regress Y on X. Show the usual statistics and a scatter plot with the regression line. Save the plot and open it.

2. Create an App

Prompt

Create a single-page app — one self-contained HTML file that runs in the browser, no server and nothing to install — for a user to upload an Excel file containing X and Y columns. Regress Y on X. Show the usual statistics and a scatter plot with the regression line.

3. Refine the App

Prompt

Modify the app so that, if the Excel file has a date or month column, the date appears in the hover data on the scatter plot.

4. Deploy the App

There is a one-time setup needed before deploying (create a free GitHub account, tell Claude to do the rest). The following prompt works for me.

Prompt

Name the app regression.html. Copy it to the docs folder. Commit and push.

Wait a minute or so, then go to rice-workshop.kerryback.com/regression.html

Improve the User Interface

It is probably worthwhile to ask Claude to install the front-end design plugin from Anthropic's marketplace **before building apps**.

Prompt

```
/plugin install frontend-design@claude-plugins-official
```

Artifacts

This can be done in Claude Desktop (or at claude.ai). Choose [Home/Artifacts](#). Then [New Artifact](#) (in Desktop, select either Chat or Cowork).

Prompt

Create an artifact for a user to upload an Excel file containing X and Y columns. Regress Y on X. Show the usual statistics and a scatter plot with the regression line.

Publish

Data

Data is generally a problem, but there is quite a bit of free finance data available. This uses my finance-data plugin ([/plugin install finance-data@kerryback](#) or Academic Studio/Run Setup))

Prompt

Get the market excess return and risk-free rate from French's data library for the past 60 months and compute monthly returns for Tesla from Yahoo Finance data. Run the CAPM regression and report the results.

Tutors

Idea

- AI displays page of teaching
- AI asks questions, provides feedback
- Could make stand-alone, per-course or per-topic (need API call for AI)
- Easier to make Claude skill, student's Claude is AI

Example — Binomial Option Tutor

- `/plugin marketplace add ricebusiness/plugins`
- `/plugin install tutor@ricebusiness`
- Start a new conversation
- Enter `/tutor:binomial`

What the Binomial Tutor Does

Four modules

- Replication and no-arbitrage in a one-period tree
- Where the risk-neutral probability comes from
- Two-period and n-period backward induction
- American options and early exercise

Coaching, not answers

- The student produces the numbers; Claude asks and then waits
- A wrong answer is diagnosed from the number itself, and answered with a question
- The whole arc runs 30–45 minutes, and the student can stop between modules

The SKILL.md

```
---
name: binomial
description: >-
  Interactive tutor for binomial option pricing. Walks a student through
  replicating portfolios and no-arbitrage pricing in a one-period tree, risk-
  neutral probabilities, two-period and n-period backward induction, and
  American options and early exercise – asking the student to work problems
  and giving diagnostic feedback on their answers. Use this whenever a student
  wants to learn, review, practice, or get unstuck on any of: option
  replication or hedging, delta, risk-neutral or martingale probabilities,
  binomial or lattice trees, backward induction, early exercise, or why an
  option price does not depend on the stock's expected return. Trigger it for
  "/tutor:binomial", "teach me the binomial model", "I don't get risk-neutral
  probabilities", "quiz me on option pricing", "check my work on this tree",
  "why would you ever exercise a put early", and for pasted homework problems
  or half-filled trees. Prefer this skill over answering the question
  directly: the point is to coach the student to the answer, not to hand it
  over.
---

# Binomial Option Pricing Tutor

You are tutoring a student one-on-one. The student learns by producing numbers,
not by watching you produce them. Everything below serves that.

## The one rule that matters most

When you ask the student a question, stop and wait. Do not ask a question and
```

What Else Is in the Plugin

Reference files

- One teaching script per module, plus a bank of problems with verified answers
- SKILL.md names them but does not contain them — Claude reads a module only when the student gets there
- Keeps the always-loaded instructions short and the material deep

A Python script

- Prices European and American calls and puts on a tree, and reports the replicating portfolio at every node
- Claude runs it before asserting any number, so it never marks a correct answer wrong
- Can blank out a node to turn any tree into an exercise, and plot the trees

Why it is a plugin, not a prompt

The tutoring protocol, the course material, and the arithmetic live in one installable package that any student can add in two commands, and that you can revise once for everyone.

Example: Agency Tutor

Business law, bundled in the same plugin (buyer beware!)

- Start a new conversation
- Enter **/tutor:agency**

What the Agency Tutor Does

Four modules

- Actual authority — what the agent was entitled to do
- Apparent authority — what the third party was entitled to believe
- Ratification and estoppel, when there was no authority at all
- Who pays: disclosed, unidentified, and undisclosed principals

Fact patterns, not lectures

- The student gets a one-paragraph problem and has to call it
- A wrong answer is diagnosed from the theory the student named, not corrected
- Runs 40–50 minutes, and stops cleanly between modules

The Same Concept, Different Details

	Binomial tutor	Agency tutor
The student produces	A number	A theory, and a call
How Claude knows the answer	<code>binomial.py</code> prices the tree	<code>agency.py</code> builds the fact pattern and the answer key from the same settings
How a wrong answer is diagnosed	The number names the mistake	The theory named reveals the step skipped
The failure to guard against	Marking a correct answer wrong	Inventing a case citation

Teaching Tool Demos

Installing the Plugins

Four plugins, one marketplace. Type each line at the Claude Code prompt.

Step 1 — add the marketplace

```
/plugin marketplace add kerryback/skills
```

Step 2 — install the four plugins

```
/plugin install voiceover@kerryback
```

```
/plugin install participation@kerryback
```

```
/plugin install poll@kerryback
```

```
/plugin install screenshare@kerryback
```

Restart Claude after installing. Each plugin builds its own small Python environment the first time you run it, so the first launch is slower than the ones after.

Demo 1 — Narrated Video from a Deck

What it does

- You give it the **PDF** of your slides — nothing else
- Claude writes the narration; you edit any line you don't like
- ElevenLabs voices it into an .mp4 plus a .txt transcript

What you do

- Download `slide_rule.pdf`
- Enter **`/voiceover slide_rule.pdf`**
- Read the narration, rewrite one slide, then generate

Needs a free ElevenLabs API key, pasted into the banner at the top of the app. Seven slides fits inside the free monthly quota. Your students receive an mp4 to watch.

Demo 2 — Participation from a Photo Roster

What it does

- Imports an ESTHER course roster PDF — every name and headshot
- Tap 1–3 for amount and 1–3 for quality, add a note, set the date
- Save writes one row per student to `participation.csv` in the course folder

What you do

- Save the roster PDF from the **Zoom chat**, or pull your own from ESTHER
- Enter **/participation**
- Set up a class, import the roster, score three students, open the CSV

The sample roster is a real one, so it goes out in the chat rather than on the course site. Claude's only job is to start the app — it launches a local web server on your machine and tells it where the PDF is. The app reads the roster itself, so the names and headshots never pass through a model and never leave your laptop.

Demo 3 — A Live Poll on Their Phones

What it does

- Type the question as a sentence; Claude works out what kind of poll it is
- Multiple choice, word cloud, confidence scale, numeric estimate, ranking
- Anonymous by design — no names, no roster, nothing stored per student

What you do

- At start of class enter **/poll** in Claude in the classroom computer. Brings up a QR code in browser.
- Students connect
- During class, either **/poll** for prepared poll or **[/poll]** for on-the-spot
- Needs cloudflared on classroom computer, and I have to check it is not blocked (workaround exists)

```
/poll How confident are you using AI in your teaching? 1 to 5
```

Demo 4 — Student Screen Shares

- Enter **/screenshare** on the classroom computer
- Show the browser page that opens — join link and room code on the page
- Students connect on their laptops
- Return to the page and select a student to share whenever you want

Also needs cloudflared, but workaround exists if blocked